STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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MEMORANDUM

11 July 2003

TO: CLAMP Steering Committee Members

FROM: Perry J Lund, Technical Advisory Committee

SUBJECT: Milfoil Treatment in Capitol Lake

At the request of the CLAMP (Capitol Lake Adaptive Management Plan) Steering Committee, a Technical Advisory Committee was formed to assess the question of using salt water back filling as a means of controlling Eurasian water-milfoil (*Myriophyllum spicatum*) in Capitol Lake. The question was raised after concerns were voiced over the use of the approved aquatic herbicide SONAR (fluridone) in Capitol Lake because of its relatively short residence time before discharging into Budd Inlet. The TAC, with representatives from the Squaxin Island Tribe, Thurston County, the cities of Tumwater and Olympia, and the departments of General Administration, Agriculture, Natural Resources, Fish and Wildlife, and Ecology met on two occasions to discuss this issue (3, 24 June 2003).

After considerable debate, the TAC agreed that a recommendation be made to the CLAMP advising no action be taken this year to conduct any treatment in Capitol Lake to control milfoil. We do not have enough information to adequately assess the possible deleterious effects of either treatment option and there is enough uncertainty over the potential efficacy of using SONAR or salt water to control milfoil in the unique environs of Capitol Lake. Based on the information we have presently, the potential benefit associated with controlling milfoil in Capitol Lake with either SONAR or salt water is not great enough to accept the risks associated with either option.

We also do not have the time to gather the necessary information quickly enough to ensure the successful implementation of a control plan in the time available for 2003. Therefore, in addition to our recommendation that no treatment be conducted this year, we urge the Steering Committee to approve the collection of additional information on the existing conditions of the lake (e.g., water quality, plant communities, and bathymetry) and other information necessary to allow for a complete assessment of the risks and benefits associated with treating Capitol Lake, or allowing the milfoil to remain. This information could be collected over the next few months allowing for adequate time to pursue a desired course of action in 2004.

SONAR

The two primary questions concerning the use of SONAR are whether adequate contact time can be achieved in Capitol Lake and the direct flow into marine water (Budd Inlet) with a chemical that has only been approved for use in fresh water. For fluridone to be effective it is necessary to be in contact with the milfoil for a period of 8 to 10 weeks at concentrations of 8 to 10 parts per billion. Because Capitol Lake is really an extension of the Deschutes River, the hydraulic residence time is less than typically experienced in a lake system. Repeated treatments over a 10-week period would be necessary to maintain adequate concentrations of fluridone. It would be useful to have a better understanding of the flow characteristics of Capitol Lake to model the expected concentrations over time and throughout different portions of the lake. A review of available research on fluridone treatment in flow-through systems is also recommended.

The label for the approved application of SONAR includes the following restriction: "Do not apply in tidewater/brackish water." This restriction has been raised as a concern in relation to the direct connection of Capitol Lake to Budd Inlet. The departments of Agriculture and Ecology are in agreement that treatment in Capitol Lake with flow through to Budd Inlet does not constitute an application in tidal water and would, therefore, be in compliance with label requirements. Further, information from Sepro, the manufacturer of SONAR, states that the necessary testing has been done on marine species to show that there are no adverse effects when used according to label requirements. However, Sepro has not sought the approval from the US EPA to remove this label restriction due to a lack of demand for use in marine environments. If a permit was issued, Ecology would establish minimum requirements for fluridone concentrations in the outfall and would require monitoring to ensure that threshold was maintained. The TAC recommends gathering additional information on the effects of fluridone on marine organisms.

Finally, because of the prolonged contact period required, the growth habits of milfoil, and the low-flow period of the Deschutes River it is essential that treatment occur in July and August for any likelihood of success. It would be almost impossible to meet that timeline for this year. If this course of action is chosen, preparation should begin soon to obtain the necessary approvals well in advance of July 2004.

Salt Water

Draining Capitol Lake of fresh water and back-filling with salt water was performed by GA as a routine operation until 1997. This practice was discontinued after considerable discussion by the Technical Committee and others involved with the management of the lake. There were several regulatory and technical reasons associated with that decision.

The permit for the construction of Heritage Park issued in 1997 requires the protection of the freshwater mitigation sites within Capitol Lake. Salt water flushing could significantly impair the wetlands that were created adjacent to Heritage Park and the larger mitigation area at the south end of the middle basin. The safest way for GA to ensure that these systems are maintained as freshwater sites is to prevent contact with salt water.

Salt water is as effective a toxin as any chemical under the right circumstances, but it is not target specific; all in-water plant communities will be affected, not just rooted aquatic vegetation (e.g., milfoil). Sodium chloride works in the same manner as other chemical agents, by disrupting the ph of many organisms. Freshwater organisms, plants and animals, have not developed the response mechanisms necessary to process elevated salt concentrations. This can result in decreased productivity or death. The entire freshwater community will be affected by salt water flushing; insects, plants, and other organisms. There has not been a comprehensive assessment of the existing habitat conditions in Capitol Lake since 1997. Without that information we can not have any certainty about the expected impacts resulting from back-filling Capitol Lake with salt water.

Available research also shows that milfoil has a greater tolerance to saltwater than many other species. Milfoil can withstand salinities in the range of 12 to 15 parts per thousand (ppt). Salt tolerance is usually measured at a threshold of 5 ppt; marine water is generally about 25 to 30 ppt. Other species of freshwater plants and animals do not have the ability to withstand salinities as high as milfoil. To effectively treat milfoil with salt water the salinity level would have to be high enough to affect the rest of the lake. Sampling done after the back-filling in 1996 and 1997 shows that it is extremely difficult to achieve and maintain elevated salinity levels throughout the lake. The problem then becomes similar to that of using SONAR – establishing conditions that maintain the contact time and concentrations necessary to achieve effective treatment.

The recovery time of the lake is much greater after salt water flushing as a result of the significance of the disturbance. The entire structure of the lake is disrupted, from algae and bacteria to fish and vegetation. There is a significant period of time required after salt water flushing for these pieces to be put back together. This almost complete elimination of biota in the lake makes it highly susceptible to future infestations of invasive species because there is nothing to prevent any other organism from moving in.

The release of brackish water into Budd Inlet after salt water flushing is known to have significant negative water quality impacts to the bay from high nutrient loading and the resulting low oxygen availability. Studies by LOTT showed a significant decrease in dissolved oxygen levels in Budd Inlet for a period of time after the flushing of Capitol Lake.

By adopting the Capitol Lake Adaptive Management Plan (October 2002), GA and the partnering entities agreed to keep Capitol Lake as a freshwater system for at least the next ten years while management alternatives are explored. We have a six-year head start on this process because salt water has been kept out of the lake since 1997. Reintroducing salt water now will very likely have a significant negative impact on the existing fresh water system; and even under an adaptive management approach, caution should be exercised before pursuing this option.

Status Quo

The TAC advised GA to consider a third alternative to managing milfoil in the lake; the “Do Nothing” alternative. There are not significant beneficial uses that are impaired by the presence of milfoil in Capitol Lake. There is a limited amount of boating and fishing that occurs on the

lake, but other (human-related) beneficial uses are generally restricted to out of water activities (e.g., walking and jogging, scenic viewing). Safeguards could be taken to prevent boaters and others from transporting milfoil out of the lake and into other freshwater systems. Some effort would need to be made to inform the community of the decision to leave the milfoil alone and safety measures that need to be taken (e.g., signs, boating restrictions, etc.). If aesthetics (i.e., maintaining a smooth surface on the reflecting pool) is the principle reason for treating Capitol Lake, then other options such as mechanical harvesting may meet that objective in a limited area.

There is some literature available that indicates fish, birds, and invertebrates use milfoil for cover and food. So, while a community of diverse native vegetation would be preferable as habitat, we could argue that some habitat in Capitol Lake is better than none. More information on the existing conditions in Capitol Lake, including a survey of plant and animal community diversity and density, would help in evaluating this alternative against the treatment options as well as provide necessary background information for the overall CLAMP process. The TAC also recommends continuing and enhancing existing monitoring in Capitol Lake to evaluate the effects of dense beds of milfoil on dissolved oxygen levels and other water quality parameters.

Final Recommendation

Given the questions surrounding either treatment option, the short time to the end of this growing season, and the lack of information about the present habitat features in Capitol Lake, the TAC advises that no treatment be pursued this year (2003).

In addition, more information is needed before a treatment option is selected for 2004. Foremost among the questions to be answered is – Can the necessary concentrations of SONAR be maintained for the duration of the contact period? Can a salinity level be established and maintained in the lake sufficient to destroy milfoil? What are the current habitat features (plants and animals) in Capitol Lake that would be impaired or eliminated by salt water? Are the beneficial uses of Capitol Lake or adjacent waters impaired or threatened to such a degree that treatment using herbicides or salt water is warranted given the chances of success and the risks to the environment?

Finally, the TAC is also of the opinion that the language of Objective #12 of the ten-year Vision Statement - Eliminating the Purple Loosestrife and Eurasian Milfoil noxious weed infestations throughout Capitol Lake, needs to be amended for milfoil. Setting a goal of eradication of a weed like milfoil is, perhaps, unrealistic. The Steering Committee should revisit this objective and establish a more reasonable and reachable goal; perhaps one of control at a defined and acceptable level. This should allow GA to more realistically define the needs for Capitol Lake and set a management course accordingly.

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